

APPENDIX F

Estimated Dredge Volumes at Piers

**Richmond-San Rafael Bridge Seismic Retrofit
Pier Excavation and Backfill Quantities**

Pier #	Volume of Sediment Removed (Cubic Yards)			Volume of Backfill (Cubic Yards)
	Pier Excavation	Pile Clean-out	Total	Backfill
CONCRETE TRESTLE SECTION				
<i>Concrete Trestle</i>	<i>0</i>	<i>7,200</i>	<i>7,200</i>	<i>0</i>
BARGE ACCESS DREDGING				
<i>Barge Access Dredging</i>			<i>135,000</i>	<i>0</i>
WEST APPROACH STRUCTURE				
A ^b	154	17	171	140
1 ^b	154	23	177	140
2 ^b	224	26	250	140
3 ^b	98	28	126	140
4 ^b	98	30	128	140
5 ^b	98	35	133	140
6 ^b	84	23	107	140
7 ^b	117	23	140	140
8 ^b	275	23	298	175
9 ^b	178	26	204	175
10 ^b	381	26	407	175
11 ^b	273	26	299	175
12 ^b	270	28	298	175
13 ^b	511	28	539	175
14 ^b	178	28	206	175
15 ^b	178	28	206	175
16 ^b	270	27	297	175
17 ^b	178	28	206	175
18 ^b	270	28	298	175
19 ^c	1,218	2,242	3,460	372
Total	5,207	2,743	7,950	3,417
Average per Pier	274	144	418	180
MAIN STRUCTURE				
20	405	566	972	186
21	959	723	1,682	186
22	405	723	1,128	186
23	405	723	1,128	186
24	417	723	1,140	192
25	589	723	1,312	192
26	262	723	985	192
27	628	832	1,460	204
28	628	832	1,460	204
29	830	832	1,662	204
30 ^c	1,029	1,570	2,599	372
31	445	832	1,277	204
32	628	832	1,460	204
33	1,295	832	2,127	204
34 ^c	5,371	2,193	7,564	598
35 ^c	2,185	2,193	4,378	598
36	1,052	983	2,035	204
37	613	1,059	1,672	199
38	810	832	1,642	199
39 ^b	296	24	320	209
40 ^b	195	38	233	209
41	273	1,097	1,370	199
MAIN STRUCTURE (continued)				

**Richmond-San Rafael Bridge Seismic Retrofit
Pier Excavation and Backfill Quantities**

Pier #	Volume of Sediment Removed (Cubic Yards)			Volume of Backfill (Cubic Yards)
	Pier Excavation	Pile Clean-out	Total	Backfill
42	1,027	1,172	2,199	199
43	615	868	1,483	199
44 ^c	796	1,102	1,898	352
45	434	868	1,302	199
46	830	1,059	1,889	204
47 ^c	2,859	2,036	4,895	539
48 ^c	3,417	1,868	5,285	539
49	1,295	643	1,938	204
50 ^b	109	51	160	198
51 ^b	273	33	306	186
52 ^b	385	34	419	186
53 ^b	670	37	707	186
54 ^b	845	30	875	186
56 ^b	273	29	302	186
57 ^b	285	30	315	198
58 ^b	296	43	339	209
59 ^b	180	41	221	186
60 ^b	180	34	214	186
Total	34,489	29,863	64,353	9,673
Average per Pier	1,815	1,572	3,387	509
EAST APPROACH STRUCTURE				
61	446	0	446	155
62	340	0	340	340
63	340	0	340	340
64	340	0	340	340
65	341	0	341	341
66	0	0	0	0
67	0	0	0	0
68	0	0	0	0
69	0	0	0	0
70	0	0	0	0
71	340	0	340	0
72	340	0	340	0
73	340	0	340	0
74	340	0	340	0
75	577	0	577	577
76	526	0	526	526
77	464	0	464	464
78	0	0	0	0
Total	4,734	0	4,734	3,083
Average per Pier	263	0	263	171
TOTAL	44,430	32,604	219,237	16,173
^a Based on Richmond-San Rafael Bridge Maintenance Report dated March 1991. ^b Pier retrofit without pile cap ^c Bell piers. Note: Pier 55 does not require retrofit - Piers 66-74 and 78 are land piers.				